In the Aleutian region the center of low pressure lay nearly over or slightly to the westward of Dutch Harbor, and on several days during the first third of the month was sufficiently active to occasion storm to hurricane winds over an area roughly embraced between the 45th and 50th parallels, and from the 180th meridian eastward to longitude 165° W. The LOW had decreased greatly in activity during the last half of March. A secondary LOW occurred intermittently over the Gulf of Alaska, and from it cyclones entered the continent on the 1st, 4th, 7th, 14th, 19th, 21st, 23d, and 26th. Few gales were reported from this area, however. In fact, comparatively little stormy weather occurred east of the 160th meridian of west longitude. West of it, in addition to the area of violent storm already alluded to, the square roughly bounded by the 35th and 50th parallels, 150th and 170th meridians of east longitude, was the scene of an equally violent storm from the 8th to the 11th. The following report from the American tank steamer *Capsa*, Yokohama to San Francisco, T. N. McLeod, master, G. Watts, navigating officer and observer, will serve as an index to the roughness of the weather of this period:

March 8, 1925.—8 hours, ESE. 5, 29.74. Moderate westerly swell, overcast sky, sleet, visibility moderate. Noon, position by D. R., 42° 10′ N., 167° E. SSE. 9, 29.32. Moderate to heavy sea, overcast, moderate visibility. 13 hours, SE. 10, 29.20. Weather conditions indicating cyclone in vicinity. Reduced to half speed and hove to, starboard tack, heading ESE. 14 hours, SE. 11, 29.15. 15 hours, SE. 11, 29.10. 16 hours, SSW. 11, 29.00. Mountainous sea, very heavy rain with severe squalls. 17 hours, SW. 10, 29.00. Vessel heading SSE. 18 hours, SW. 8, 29.03. 19 hours, SW. 7, 29.00. 20 hours, SW. by W. 7 to 6, 28.97. Vessel hove to heading S. by E., labouring heavily to mountainous sea, violent rain squalls. 21 hours, WSW. 8, 28.98. Vessel heading S. by E. 22 hours, W. by S. 7, 29.00. Vessel heading south. 23 hours, W. 8, 28.98. Vessel heading south. Midnight. W. 8, 28.91. Vessel heading south, labouring and straining heavily to mountainous confused sea, violent squalls.

March 9.—1 hour, W. 8, 28.87. Hove to heading south, riding to mountainous sea; 1.20, engines eased to slow ahead. 2 hours, W. 9, 28.78. 3 hours, W. 10, 28.78. Vessel heading SW. 3.30 hours, W. 12. Very fierce squalls, with heavy rain and hail. Centre passed vessel's stern, traveling NE. by N. 3.45 hours, W. by N. 11. Barometer rising. 4 hours, WNW. 12, 29.03. Vessel hove to heading SW. by W., mountainous sea, fierce squalls. 5 hours, NW. by W. 11, 29.15. 6 hours, NW. 10, 29.40. 7 hours, NW. 9, 29.43. 8 hours, NW. 8, 29.50. Vessel hove to heading SW. by W., very heavy sea, cloudy sky, clear weather.

The various reports indicate more frequent and heavier snow squalls over the western half of the northern sailing routes than during any previous month of the season.

No information is at hand indicative of storms of a tropical nature in the Far East.

Along the western coast of Mexico and Central America conditions were quiet, no vessel reporting a single gale in these waters.

Except over the central Aleutians, pressure was practically normal at the island stations usually considered in connection with this meteorological element. At Dutch Harbor the average 8 p. m. pressure was 29.63 inches, or 0.11 inch less than the normal. The extremes were 30.42, on the 26th, and 28.56, on the 20th. To the eastward, at Kodiak, the average pressure was 29.76, or 0.01 inch above the normal. Here the extremes were 30.28, on the 11th, and 28.80, on the 3d. At Midway Island the 8 p. m. average was 30.09, or also plus 0.01 inch. The extremes were 30.34, on the 30th, and 29.82, on the 13th. A similar plus departure of 0.01 inch occurred at Honolulu, the average being 30.03, and the extremes, 30.17, on the 30th, and 29.75, on the 13th, these dates coinciding with those of similar data at Midway Island.

Fog was observed over nearly all parts of the ocean north of the 30th parallel, though most frequently east of the 170th meridian west. Here, especially between the 45th and 52d parallels, eastward to the 140th meridian, fog was entered by vessels on nearly every day from the 4th to the 20th. Along the American coast less fog was reported than in February—none from southern waters, and little north of San Francisco. Between San Francisco and the 30th parallel fog was noted by steamers on nine days.

DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

ALFRED J. HENRY

March, 1925, like February, its immediate predecessor, was characterized by above-normal temperature in all parts of the country save the extreme southern tip of Florida. It was the second month of above-normal temperature in all parts of the country—a rare occurrence. The drought continued and was especially severe in the Gulf States and the Southwest.

A characteristic of both February and March, 1925, was the lack of intensity in the cyclones which gave character to those months. In March, 90 per cent of the cyclones decreased in energy with movement toward the Atlantic seaboard and a relatively large percentage did not reach the coast line. The usual details follow.

CYCLONES AND ANTICYCLONES

By W. P. DAY

The rapid fluctuations in pressure and temperature which characterized February continued in lessening degree during March. The number of LOWS charted was about the same as in January and February, but there was a falling off in the number of HIGHS. Two important storms affected interior districts, one which developed over the Southwest on the 12th and moved northeastward to Eastport, Me., by the night of the 14th, and another, originating over the Pacific, but of little importance until it had swung southeastward across the Rocky Mountains, which developed considerable intensity during the evening of the 18th as it passed over southern Illinois and southern Indiana. It was at this time that several very severe tornadoes occurred, their tracks paralleling that of the major disturbance. A typical Spring HIGH developed and spread southward over the Lake region between the 29th and the 1st of April.

FREE-AIR SUMMARY

By V. E. JAKL

It will be seen from Tables 1 and 2 that free-air conditions in March corresponded quite closely with the normal. This applies to the averages for all elements, for while there was a general excess in temperature at all stations for all levels, the departures were unimportant, being in no case more than two whole degrees above normal. The averages of relative humidity and vapor pressure for the upper air also show that while the month was drier than usual, the departures were unimportant.

As regards wind resultants for the month, there was some deviation from the normal in the lower levels, but on the whole, so far as averages are concerned, the month can be considered a normal one in that respect. These wind resultants are shown more comprehensively by the pilot-balloon observations, which give practically the same results as shown in Table 2 for kite observations, i. e., winds varying from southwest to northwest for the different stations in the lower levels, but becoming more westerly with altitude. At 4,000 meters altitude and above, winds from almost due west prevailed generally east of the Rocky Mountains.

While the averages show approximately normal winds, there was considerable variation from day to day, and at times marked differences in both velocity and direction between winds aloft and those near the ground. From the well-known relation between wind direction and temperature, these variations were naturally reflected in the records of temperature for individual days. Another feature of the month therefore, was the variability of temperature, not only as regards the temperatures themselves, but in the lapse rates with altitude. In addition to this variability, and probably resulting therefrom, there was frequent evidence in the records of unusual contrasts in temperature between adjoining regions.

A few examples from the records will serve to illustrate this variability in upper air temperature with time, distance, and altitude. On the 7th, the temperature at Drexel and Broken Arrow at 2,500 meters was almost identical, while in the first few hundred meters above the ground it was 18° C. warmer at the southern station; and again on the 12th, the temperature difference between these two stations changed in the opposite direction with altitude, the excess in temperature at Broken Arrow over that at Drexel increasing from 5° C. on the ground to 10° at 4,000 meters. At Royal Center the temperarose rapidly at all levels from the 2d to the 7th, the magnitude of the change being emphasized by the fact that on the 2d, the temperature from 500 to 1,500 meters was the lowest of record for the month, while on the 7th the temperature at 3,000 meters was the highest of record. On the 9th the temperature at Royal Center above 2,000 meters was still high, but in the lower levels had fallen, so that the temperature was about the same at 500 and 3,500 meters. Similarly, at Ellendale, a change is noted from low temperatures on the 1st—at some levels the lowest of record—to temperatures considerably above the normal on the 5th.

Considering differences in temperature between stations in a longitudinal direction, it is found on comparing Drexel and Royal Center, which are about 500 miles apart on an almost east-west line, that on the 2d it was considerably colder at Royal Center, especially in the higher levels, where, at 3,000 meters, it was 13° C. colder at Royal Center than at Drexel; while on the 10th the temperature at Drexel was lower than at Royal Center by an amount varying from 18° on the ground to 8° at 2,500 meters.

Means for the aerological stations show that the largest latitudinal contrasts in temperature at all levels occur in midwinter. It is, however, possible that in spring there are occasional inequalities in temperature, both latitudinally and longitudinally, and extending to a great depth, that approach those of winter in magnitude. So far as such contrasts in temperature are conducive to instability, those of spring are undoubtedly of more importance, owing to the greater moisture content of the air in spring than in winter. These means furthermore seem to show that in the higher levels there is in the spring months a temporary reduction in the rate of rise in temperature from midwinter to midsummer, from which it may inferred that at this time of year occasional strong lapse rates in temperature are likely to occur, when for any reason the temperature in the lower levels rises rapidly. These facts are of significance, in view of the fact that tornadoes are to a large extent peculiar to the spring months.

Free-air observations pertaining directly to the tornadoes of the 18th, will be discussed in the April REVIEW. The following extract from the report of the official in charge at Royal Center is of interest in connection with a severe thunderstorm that occurred at that station on the 10th, and which appeared to have some of the characteristics of a tornado:

> During the 2d flight a thunder squall of almost tornadic severity suddenly struck the station, causing considerable damage in this vicinity from broken windows, chimneys blown down, and outbuildings destroyed. In some cases there were evidences of a gyratory motion, as movable objects were found in places relative to their former positions, that indicated that their movement was backward instead of with the direction of progression of the disturbance. In some instances the windows were forced outwards, indicating that there must have been less pressure outside of the building than on the inside. This happened in the case of my own residence. Lightning struck the kite line at about 2:50 p. m., destroying 3,000 meters of wire and liberating 3 kites. The kites were recovered the next day about 6 miles northeast of the station.

This storm occurred along a typical wind-shift line in the southern portion of a LOW in which also, a strong temperature gradient extended from Saskatchewan southeastward to the Ohio Valley. The records show that the surface wind at Royal Center shifted abruptly from southwest to northwest at 2 p. m., continuing from the latter direction till the following day. The change in direction was accompanied by a rapid fall in temperature. Aloft, however, it is apparent from the records and the above account, that the wind remained about southwest to at least as low an altitude as 1,400 meters until past the time when the kites broke away at 2:50 p. m., the velocity being from 40 to 50 miles per hour. The surface northwesterly wind blew at the rate of 12 to 16 miles per hour, except at the height of the storm from 2:12 to 2:17 p. m., when a velocity of 54 miles per hour was recorded, with an extreme velocity of 70 miles per hour.

A condition somewhat related to the foregoing is that shown by the observation at Due West on the 31st, which was made at a time when a secondary depression, apparent on the p. m. map of that date on the Atlantic coast, was presumably forming in the vicinity of Due West. The observation was begun soon after the surface wind changed abruptly from west-southwest to north-northeast. The temperature above 3,000 meters was the lowest of record for March, while the temperature at and near the ground rose during the day until a dry adiabatic lapse rate extended to 3,900 meters. This is shown in the following table:

Altitude, M. S. L., meters	Time, P. M.	Temperature ° C	Wind direction	Wind velocity	Time, P. M.	Temperature, ° C.	Wind direction	Wind velocity
217 (surface)	4:21	17.8	nne	9	7:06	10.0	ne	8
1,000	4:38	7.9	n	12	6:56	3.0	nne	11
2,000	5:05	−1.5	nw	10	6:40	−5.6	n	18
3,000	5:35	−11.6	wnw	15	6:19	−12.4	nw	19
3,900	6:05	−17.7	wnw	23				

To the north cloudy weather and lower temperatures prevailed. A possible explanation of the formation of the secondary is therefore that a line of discontinuity in temperature formed between the cool cloudy weather to the north and the warm clear weather to the south, and that the high lapse rate in the region of Due West, by its instability, facilitated the intrusion of colder air in the lower levels from the north and northeast.

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during March, 1925*

TEMPERATURE (°C.)

Altitude. M. S. L. m.	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (225 m.)	
	Mean	Departure from 7-year mean	Mean	Departure from 10-year mean	Mean	Departure from 5-year mean	Mean	Departure from 8-year mean	Mean	Departure from 7-year mean	Mean	Departure from 7-year mean
Surface	12.2	+2.1	3.3	+0.1	11.6	−1.5	−0.5	+2.3	14.3	+0.9	5.4	+0.8
250	12.1	+2.1			11.4	−1.4			13.6	+0.8	5.1	+0.7
500	10.3	+2.1	3.0	+0.3	10.2	−0.8	−0.9	+2.0	12.8	+1.2	3.1	+0.7
750	9.3	+2.4	2.6	+0.9	8.8	−0.7	−2.1	+1.4	12.3	+1.6	2.3	+1.0
1,000	8.5	+2.4	2.9	+1.6	7.5	−0.7	−2.8	+1.0	11.6	+1.6	1.9	+1.3
1,250	7.8	+2.2	2.7	+1.5	6.4	−0.6	−3.3	+1.0	11.6	+2.2	1.0	+1.1
1,500	6.7	+1.8	2.3	+1.5	4.9	−0.8	−3.9	+0.9	11.4	+2.6	0.2	+1.1
2,000	4.5	+1.3	0.0	+1.0	2.2	−1.2	−5.9	+0.6	9.5	+2.2	−0.7	+1.6
2,500	1.7	+0.9	−2.6	+0.9	−0.9	−2.0	−8.5	+0.3	7.0	+1.8	−3.0	+1.5
3,000	−1.3	+0.6	−5.3	+0.8	−3.7	−2.6	−11.5	−0.1	4.8	+2.0	−5.5	+1.3
3,500	−4.4	+0.2	−8.0	+0.8	−5.9	−2.5	−14.4	−0.4	1.1	+1.0	−7.9	+1.1
4,000	−8.2	−0.4	−11.3	+0.1	−9.1	−2.8	−16.6	0.0			−11.6	−0.2
4,500			−14.0	+0.8	−12.1	−2.6	−17.8	+1.9				
5,000					−15.7	−2.6	−20.9	+2.1				

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during March, 1925*—Continued

RELATIVE HUMIDITY (%)

Altitude. M. S. L. m.	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (225 m.)	
	Mean	Departure from 7-yr. mean	Mean	Departure from 10-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 7-yr. mean	Mean	Departure from 7-yr. mean
Surface	53	−11	67	−1	58	−4	65	−10	63	−6	66	−5
250	53	−11			58	−4			63	−5	66	−5
500	53	−10	64	−3	55	−6	65	−9	64	−2	67	−3
750	50	−11	57	−8	53	−8	63	−6	58	−5	64	−3
1,000	47	−12	50	−11	50	−11	59	−6	53	−6	60	−4
1,250	42	−13	46	−10	47	−14	54	−7	45	−9	57	−4
1,500	40	−11	43	−9	46	−15	50	−8	38	−12	53	−6
2,000	37	−7	45	−6	45	−11	50	−6	35	−7	46	−10
2,500	36	−5	46	−5	45	−6	50	−6	36	−2	44	−11
3,000	35	−4	45	−7	39	−7	55	−2	30	−5	36	−18
3,500	29	−9	47	−5	34	−9	56	−1	29	−4	6	−45
4,000	30	−8	49	−2	36	−9	44	−11			6	−45
4,500			46	−8	36	−8	37	−18				
5,000					47	−2	37	−19				

VAPOR PRESSURE (mb.)

Surface	7.67	−0.74	5.19	−0.09	8.15	−1.79	3.91	+0.04	11.12	−0.30	6.14	−0.25
250	7.61	−0.72			8.06	−1.72			10.75	−0.16	6.05	−0.22
500	6.74	−0.66	4.95	−0.05	7.23	−1.52	3.84	+0.08	10.35	+0.55	5.36	+0.01
750	6.01	−0.63	4.40	−0.06	6.37	−1.57	3.44	+0.16	9.06	+0.18	4.80	+0.04
1,000	5.38	−0.69	3.97	−0.03	5.52	−1.78	3.00	+0.03	7.84	+0.02	4.41	+0.13
1,250	4.61	−0.86	3.64	+0.06	4.72	−1.96	2.62	−0.10	6.39	−0.42	4.01	+0.12
1,500	4.15	−0.70	3.25	+0.03	4.02	−1.92	2.26	−0.25	5.16	−0.74	3.52	−0.05
2,000	3.11	−0.61	2.79	+0.07	3.08	−1.51	1.99	−0.16	4.06	−0.20	2.84	−0.17
2,500	2.46	−0.56	2.38	+0.06	2.29	−1.13	1.57	−0.21	3.61	+0.36	2.45	−0.12
3,000	1.90	−0.59	1.93	−0.03	1.48	−0.95	1.29	−0.13	2.27	−0.23	1.70	−0.50
3,500	1.14	−0.92	1.71	+0.09	0.91	−0.83	1.05	−0.10	1.37	−0.62		
4,000	0.68	−1.02	1.50	+0.11	0.84	−0.54	0.73	−0.17				
4,500			1.34	+0.09	0.74	−0.29	0.65	−0.05				
5,000					0.89	−0.16	0.61	+0.07				

TABLE 2.—*Free-air resultant winds (m. p. s.) during March, 1925*

Altitude M. S. L. m.	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		7-year mean		Mean		10-year mean		Mean		5-year mean		Mean		8-year mean		Mean		7-year mean		Mean		7-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 26° W.	3.4	S. 11° W.	2.1	S. 10° E.	1.1	S. 51° W.	0.6	N. 35° W.	1.3	S. 70° W.	1.8	N. 85° W.	2.3	N. 42° W.	2.1	S. 30° E.	1.2	S. 5° E.	1.1	S. 54° W.	1.9	S. 45° W.	1.7
250	S. 26° W.	3.4	S. 11° W.	2.2					N. 40° W.	1.3	S. 69° W.	2.0					S. 22° E.	2.1	S. 6° E.	1.9	S. 41° W.	2.0	S. 40° W.	1.8
500	S. 32° W.	5.0	S. 13° W.	3.6	S.	1.6	S. 49° W.	0.9	N. 44° W.	3.3	S. 74° W.	3.0	N. 88° W.	2.7	N. 49° W.	2.0	S. 5° E.	3.2	S. 7° W.	3.5	S. 69° W.	5.7	S. 50° W.	4.5
750	S. 40° W.	5.4	S. 17° W.	4.6	S. 44° W.	3.2	S. 77° W.	2.2	N. 51° W.	3.7	S. 75° W.	4.4	W.	4.3	N. 73° W.	2.5	S. 10° W.	3.5	S. 19° W.	4.2	S. 76° W.	6.8	S. 57° W.	5.7
1,000	S. 51° W.	5.5	S. 30° W.	5.3	S. 62° W.	3.9	S. 84° W.	3.1	N. 54° W.	4.3	S. 74° W.	5.5	S. 89° W.	5.6	N. 80° W.	3.1	S. 31° W.	3.5	S. 33° W.	4.9	S. 88° W.	7.3	S. 65° W.	6.5
1,250	S. 71° W.	6.0	S. 43° W.	6.0	S. 74° W.	5.1	N. 86° W.	4.1	N. 59° W.	4.9	S. 74° W.	6.8	N. 87° W.	6.5	N. 75° W.	4.0	S. 38° W.	3.6	S. 41° W.	5.3	N. 84° W.	9.1	S. 73° W.	7.7
1,500	S. 79° W.	6.8	S. 59° W.	6.2	W.	5.7	N. 83° W.	5.1	N. 69° W.	5.7	S. 76° W.	8.7	N. 85° W.	7.4	N. 78° W.	5.2	S. 47° W.	4.3	S. 48° W.	5.5	N. 70° W.	10.3	S. 79° W.	8.5
2,000	N. 86° W.	7.8	S. 74° W.	7.1	N. 81° W.	6.4	N. 82° W.	6.8	N. 75° W.	7.2	S. 80° W.	10.8	N. 83° W.	8.8	N. 77° W.	7.2	S. 58° W.	5.7	S. 60° W.	6.7	N. 72° W.	10.9	S. 83° W.	9.9
2,500	N. 80° W.	10.8	S. 85° W.	8.4	N. 74° W.	9.9	N. 85° W.	8.7	N. 75° W.	8.5	S. 89° W.	12.1	N. 87° W.	8.9	N. 76° W.	9.5	S. 51° W.	7.5	S. 66° W.	8.8	N. 71° W.	12.8	S. 85° W.	11.0
3,000	N. 76° W.	10.7	N. 88° W.	9.6	N. 78° W.	12.0	N. 85° W.	11.2	S. 83° W.	12.9	S. 84° W.	13.7	N. 86° W.	10.5	N. 77° W.	11.0	S. 53° W.	11.9	S. 69° W.	9.7	N. 77° W.	16.6	S. 89° W.	13.8
3,500	S. 84° W.	11.8	S. 80° W.	10.7	N. 71° W.	14.2	N. 80° W.	14.7	N. 79° W.	13.4	S. 85° W.	13.9	N. 89° W.	9.2	N. 83° W.	12.6	S. 53° W.	15.3	S. 74° W.	12.8	N. 83° W.	19.1	S. 88° W.	16.4
4,000	N. 81° W.	10.9	S. 80° W.	9.8	N. 69° W.	19.4	N. 76° W.	17.8	N. 86° W.	16.2	S. 83° W.	15.4	N. 70° W.	16.9	N. 85° W.	15.0	S. 45° W.	19.0	S. 70° W.	14.4	S. 61° W.	24.7	S. 82° W.	15.6
4,500	S. 78° W.	15.8	S. 64° W.	11.0	N. 67° W.	18.6	N. 77° W.	17.5	S. 79° W.	15.8	S. 85° W.	16.4	N. 65° W.	15.8	N. 89° W.	15.2								
5,000													W.	17.0	N. 88° W.	17.3								

THE WEATHER ELEMENTS

By P. C. DAY, In Charge of Division

PRESSURE AND WINDS

Considering the month as a whole, and for the entire country, March, 1925, did not maintain its reputation as a month of marked variability in weather conditions, though locally it established records that will doubtless stand as landmarks for future reference. Chief among these is the great tornado that occurred in the early afternoon of the 18th, extending from a point in southeastern Missouri east-northeastward for a distance of over 200 miles across southern Illinois, and into southern Indiana. The loss of life and damage to property from this tornado were the greatest ever experienced in the United States from a single storm of this character. In addition to the main storm track there were several minor tornadoes in adjacent areas. The total loss of life from these storms was about 800, while property damage amounted to about $18,000,000. A full account of these storms will appear in the April number of the REVIEW.

Other important local features of the month were the unusual cold for March over the southeastern districts on the 2d and 3d, the intense heat over portions of the same districts at the beginning of the second decade, the wide-spread lack of the precipitation usually expected in March, and the continued severe drought over the southwest.

The cyclones and anticyclones moving across the country were not unusual as to extent, the cyclones giving as a rule only light to moderate precipitation, while the anticyclones were not attended by severe cold save that